USGS
science for a changing world

Mineral Industry Surveys

For information, contact:
William S. Kirk, Iron Ore Commodity Specialist
U.S. Geological Survey
989 National Center
Reston, VA 20192
Telephone: (703) 648-4962, Fax: (703) 648-7757
E-mail: wkirk@usgs.gov

Ahmad T. Jami (Data)
Telephone: (703) 648-7978
Fax: (703) 648-7975

MINES FaxBack: (703) 648-4999
Internet: http://minerals.usgs.gov/minerals

IRON ORE IN JANUARY 2000

U.S. iron ore producers are continually searching for ways to cut production costs. To that end, a recently developed extractive metallurgy process and a new way of purchasing show promise.

New iron ore processing technology.—5R Research Inc. has developed a taconite processing technology that could dramatically lower production costs at taconite mines in Minnesota has been awarded a $500,000 grant by the Minnesota Department of Commerce and the U.S. Department of Energy (Bloomquist, Lee, 2000, Duluth News-Tribune, February 29, 2000, Accessed March 1, 2000 at URL: http://www.duluthnews.com/news/day1/dnt/biz/tac.htm). Based in Glen Flora, WI, the company developed magnetic elutriation, a technology which can lower production costs by saving energy and chemicals.

Elutriation is the purification or removal of material from a mixture or in suspension in water by washing and decanting, leaving the heavier particles behind. 5R's process uses a magnet design that eliminates the need for chemical dispersants, which are being used in bulk quantities (5R Research Inc., written commun., March 28, 2000). 5R's process uses no chemicals.

The magnetic elutriator is a long, tube-shaped magnetic device that agitates and disperses iron ore. The process is said to produce higher yields of taconite concentrate with a higher iron content. It is capable of achieving 99 percent iron yields (recovery) while producing a purified taconite concentrate with 3.5 percent residual tailings compared with a roughly 95 percent recovery and 4.5 percent tailings currently produced at some Iron Range mines.

A 10-ton-per-hour elutriator has been operating at EVTAC Mining Co.'s processing plant at Forbes for roughly a year. The patented process has also been tested at three other Iron Range taconite plants. Elutriators could replace magnetic separators currently in use at Northeastern Minnesota taconite plants. 5R Research plans to begin the installation in June of this year of a 250-ton-per-hour system as a commercial scale demonstration project at EVTAC Mining. The $500,000 grant will go toward construction of the $1.2 million elutriator. It is expected be operational by the end of 2000 and would be capable of processing about 2 million tons of iron ore per year.

Cliffs' new way of purchasing.—Cleveland-Cliffs Inc. has devised a way to save money by changing the way it purchases certain items (Bloomquist, Lee, 2000, Duluth News-Tribune, March 8, 2000, accessed March 10, 2000, at URL: http://www.duluthnews.com/news/day1/dnt/biz/cliffs.htm). The company recently began executing business transactions at a new location, www.Cleveland-Cliffs.com, the company's new Internet site. As part of a company wide effort to reduce purchasing costs by 20 percent, the iron ore company recently held a reverse auction on its Web site.

The auction solicited bids for the purchase of about 70 pickup trucks. Once purchased, the trucks will be used at Cliffs-managed mines in Minnesota and Upper Michigan. Cliffs owns and manages Northshore in Minnesota, is part owner and manager of Hibbing Taconite in Minnesota, the Empire and Tilden Mines in Michigan, and Wabush in Canada, and manages LTV Steel Mining Co. in Minnesota.

This is a new and innovative way of doing business for North America's largest supplier of iron ore products. Traditionally, Cliffs' purchasers have traveled to vendors' home locations to secure agreements. But in purchasing and selling products over the Internet, Cliffs hopes to cut goods and service costs as much as 20 percent by the end of 2001. Company officials hope that by using the Internet, the company will be able to strengthen its overall purchasing power and reach long-term agreements that help reduce taconite production costs.

Internet transactions will help Cliffs reduce the number of company buyers in the field, saving transportation costs and time. Inventories will also be reduced because of the Internet's speed. Companies that want to submit bids must register with Cliffs on the Web site. Initially, the company plans to use the site to solicit bids for equipment and energy needs, such as coal. Eventually, Cliffs also expects to use the site to sell used mining equipment. Under the cost-cutting program, Cliffs has already signed long-term contracts with some suppliers for the purchase of production trucks and explosives. Those agreements are expected to result in significant savings for the company.

TABLE 1
U.S. PRODUCTION AND SHIPMENTS OF IRON ORE 1/
(Exclusive of ore containing 5% or more of manganese)

(Thousand metric tons)

Period	Production		Shipments	
	Monthly	Year to date	Monthly	Year to date
1999:				
January	4,891	4,891	2,181	2,181
February	4,587	9,479	900	3,081
March	5,145	14,624	2,619	5,699
April	4,846	19,470	6,265	11,965
May	5,473	24,943	6,117	18,082
June	5,047	29,990	5,935	24,017
July	5,249	35,239	5,942	29,959
August	3,872	39,111	5,572	35,531
September	3,334	42,445	5,380	40,911
October	4,439	46,884	5,298	46,209
November	5,231	52,115	5,616	51,825
December	5,295	57,410	6,046	57,871
2000:				
January	4,955	4,955	3,822	3,822

1/ Excludes byproduct ore.

TABLE 2
U.S. PRODUCTION, SHIPMENTS, AND STOCKS OF IRON ORE IN JANUARY 1/

(Thousand metric tons)

District	Production		Shipments 2/		Stocks 3/	
	2000	1999	2000	1999	2000	1999
Lake Superior:						
Michigan	1,119	1,219	1,566	721	1,948	3,085
Minnesota	3,836	3,672	2,255	1,460	4,899	5,645
Total	4,955	4,891	3,822	2,181	6,847	8,730

1/ Excludes byproduct ore.
2/ Includes rail and vessel.
3/ Includes mines, plants, and loading docks.

TABLE 3
CANADA: SHIPMENTS OF IRON ORE

(Thousand dry metric tons)

Period	Newfoundland	Quebec	Ontario	British Columbia	Total 1/
1998:					
December	1,651	923	--	8	2,583
Year total	21,628	13,232	651	110	35,621
1999:					
January	569	1,674	--	8	2,251
February	459	528	--	6	992
March	455	642	--	5	1,101
April	1,485	1,236	--	7	2,727
May	2,236	1,316	--	10	3,562
June	1,210	1,356	--	7	2,573
July	2,102	1,266	--	6	3,373
August	1,164	1,390	--	6	2,561
September	2,636	1,150	--	8	3,794
October	1,717	1,623	--	7	3,347
November	2,485	1,387	--	9	3,881
December	1,515	1,468	--	8	2,991

1/ Data may not add to totals shown because of independent rounding.

Source: Natural Resources Canada.

TABLE 4
CONSUMPTION AND STOCKS OF IRON ORE AND
BLAST FURNACE PRODUCTION OF HOT METAL AT U.S. IRON AND STEEL PLANTS 1/

(Thousand metric tons)

	Consumption of ores and agglomerates			
	December		January-December	
Consumption by source	1999	1998	1999	1998
United States ores	5,033	4,475	56,945	57,690
Canadian ores	587	495	5,665	6,536
Foreign ores	583	482	5,417	5,737
Total 2/	6,204	5,451	68,027	69,963
Consumption by process				
Blast furnaces	5,631	4,916	62,130	63,462
Steel furnaces	5	9	57	101
Agglomerating plants 3/	568	526	5,837	6,352
Miscellaneous 4/	--	--	2	48
Total 2/	6,204	5,451	68,027	69,963

	Stocks of ores and agglomerates	
	December 31	
Storage point	1999	1998
Furnace yards	17,892	20,520
Receiving/transfer docks	2,766	4,083
Total consumer	20,657	24,604

	Blast furnace production of hot metal			
	December		January-December	
	1999	1998	1999	1998
Hot metal and pig iron produced in blast furnaces	4,284	3,737	46,371	48,230
No. of blast furnaces operating on the last day of the month	36	36	XX	XX

XX Not applicable.
1/ Includes agglomerates.
2/ Data may not add to totals shown because of independent rounding.
3/ Iron ore and iron ore concentrates consumed in agglomerating plants not located at the mine or plant site.
4/ Sold to nonreporting companies or used for purposes not listed.

Sources: American Iron Ore Association (consumption of iron ore) and American Iron and Steel Institute (production of hot metal and pig iron).

TABLE 5
U.S. EXPORTS OF IRON ORE, BY COUNTRY OF DESTINATION AND TYPE 1/

(Thousand metric tons)

Country of	1999				
destination and type	2nd quarter	3rd quarter	October	November	December
Canada	2,271	1,806	537	559	425
Mexico	(2/)	(2/)	(2/)	(2/)	(2/)
Other	6	2	1	4	4
Total 3/	2,277	1,808	538	563	429
Pellets	2,262	1,796	528	546	424
Other	14	13	9	17	5
Total 3/	2,277	1,808	538	563	429

1/ Includes agglomerates.
2/ Less than 1/2 unit.
3/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF IRON ORE,
BY COUNTRY AND TYPE 1/
(Exclusive of ore containing 20% or more manganese)

Country of origin and type of product	1999 December Thousand metric tons	1999 December Value 2/ (thousand dollars)	1999 January-December Thousand metric tons	1999 January-December Value 2/ (thousand dollars)	1999 January-December Value 2/ (dollars per ton)	1998 January-December Thousand metric tons
Australia	54	412	694	8,427	12.14	807
Brazil	569	14,342	5,541	137,512	24.82	5,984
Canada	854	26,307	6,863	207,153	30.18	8,520
Mexico	2	27	12	201	16.75	13
Peru	2/	19	63	918	14.57	126
Sweden	98	3,040	421	13,328	31.66	373 r/
Venezuela	44	1,424	327	21,132	64.62	969 r/
Other	19	1,877	332	10,417	31.38	134
Total 4/	1,640	47,447	14,255	399,089	28.00 5/	16,927 r/
Concentrates	108	1,506	1,436	23,815	16.58	1,362 r/
Coarse ores	--	--	318	9,854	30.99	465
Fine ores	331	6,794	3,392	70,770	20.86	3,177
Pellets	1,200	39,101	8,228	263,507	32.03	11,073
Briquettes	--	--	195	16,929	86.82	128 r/
Other agglomerates	2	27	676	13,652	20.20	715 r/
Roasted pyrites	2/	19	11	562	51.09	7
Total 4/	1,640	47,447	14,255	399,089	28.00 5/	16,927 r/

r/ Revised.
1/ Includes agglomerates.
2/ Customs value. Excludes international freight, insurance, and other c.i.f. charges.
3/ Less than one-half unit.
4/ Data may not add to totals shown because of independent rounding.
5/ Weighted average calculated by dividing total value by total tonnage.

Source: Bureau of the Census.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF IRON ORE IN DECEMBER 1999
(Exclusive of ore containing 20% or more manganese) 1/

(Thousand metric tons)

Country of origin	Type of product: Concentrates	Coarse ores	Fine ores	Pellets	Briquettes and other agglomerates	Roasted pyrites	Total 3/
Australia	27	--	27	--	--	--	54
Brazil	22	--	304	244	--	--	569
Canada	59	--	--	795	--	--	854
Mexico	--	--	--	--	2	--	2
Sweden	--	--	--	98		--	98
Other	--	--	--	63	--	(2/)	63
Total 3/	108	--	331	1,200	2	(2/)	1,640

1/ Includes agglomerates.
2/ Less than 1/2 unit.
3/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF PELLETS, BY COUNTRY

Country of origin	1999 December Thousand metric tons	1999 December Value 1/ (thousand dollars)	1999 January-December Thousand metric tons	1999 January-December Value 1/ (thousand dollars)	1999 January-December Value 1/ (dollars per ton)	1998 January-December Thousand metric tons
Brazil	244	7,408	1,939	60,240	31.07	2,816
Canada	795	25,353	5,784	185,490	32.07	7,448
Sweden	98	3,040	367	11,612	31.64	294
Venezuela	44	1,424	111	3,776	34.02	508
Other	19	1,877	26	2,389	91.88	7
Total 2/	1,200	39,101	8,228	263,507	32.03 3/	11,073

1/ Customs value. Excludes international freight, insurance, and other c.i.f. charges.
2/ Data may not add to totals shown because of independent rounding.
3/ Weighted average calculated by dividing total value by total tonnage.

Source: Bureau of the Census.

TABLE 9
U.S. IMPORTS FOR CONSUMPTION OF IRON ORE,
BY CUSTOMS DISTRICT 1/
(Exclusive of ore containing 20% or more manganese)

(Thousand metric tons)

Customs district	December 1999	January-December 1999	January-December 1998
Baltimore, MD (13)	389	3,205	4,373
Buffalo, NY (09)	--	1	22
Charleston, SC (16)	49	412	763
Chicago, IL (39)	135	2,342	1,703
Cleveland, OH (41)	136	783	1,217
Detroit, MI (38)	225	1,288	1,798
Houston - Galveston, TX (53)	--	69	124
Laredo, TX (23)	--	16	12
Los Angeles, CA (27)	--	(2/)	16
Miami, FL (52)	--	(2/)	--
Mobile, AL (19)	548	2,849	3,992
New Orleans, LA (20)	157	3,166	2,714 r/
Nogales, AZ (26)	2	12	13
Norfolk, VA (14)	--	16	--
Ogdensburg, NY (07)	--	--	(2/)
Philadelphia, PA (11)	--	84	179
San Diego, CA (25)	--	10	--
San Francisco, CA (28)	--	--	(2/)
Total 3/	1,640	14,255	16,927 r/

r/ Revised.
1/ Includes agglomerates.
2/ Less than 1/2 unit.
3/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF PELLETS,
BY CUSTOMS DISTRICT

(Thousand metric tons)

Customs district	December 1999	January-December 1999	1998
Baltimore, MD (13)	168	1,268	1,825
Charleston, SC (16)	49	306	417
Chicago, IL (39)	55	1,108	896
Cleveland, OH (41)	136	567	905
Detroit, MI (38)	225	1,218	1,798
Houston - Galveston, TX (53)	--	45	49
Laredo, TX (23)	--	16	13
Mobile, AL (19)	548	2,843	3,649
New Orleans, LA (20)	19	856	1,428
Philadelphia, PA (11)	--	--	94
San Francisco, CA (28)	--	--	(1/)
Total 2/	1,200	8,228	11,073

1/ Less than 1/2 unit.
2/ Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.